we claim:

In a method for making a nonporous body of high purity fused silica glass comprising the steps of:

producing a gas stream
containing a siliconcontaining compound in vapor
form capable of being
converted through thermal
decomposition with oxidation
of flame hydrolysis to SiO₂;
passing said gas stream into

- (b) passing said gas stream into the flame of a combustion buffer to form amorphous particles of fused SiO₂;
- (c) depositing said amorphous particles onto a support; and
- (d) either espentially simultaneously with said deposition or subsequently thereto consolidating said deposit of amorphous particles into a non-porous body;

the improvement comprising utilizing as said silicon-containing compound in vapor form, a halide-free [polymethylsiloxane] polymethylcyclosiloxane whereby no halide-containing vapors are emitted during the making of said non-porous body of high purity fused silica glass.

[2. A method according to claim 1 wherein said polymethylsiloxane is hexamethyldisiloxane.]

[3. A method according to claim 1 wherein said polymethylsiloxane is a polymethylcyclosiloxane.]

13]1 wherein raid polymethylcyclosiloxane is selected from the group consisting of octamethylcyclositrasiloxane, decamethylcyclositrasiloxane,

hexamethylcyclotrisiloxane, and mixtures

thereof . method according to claim 1 wherein said gas stream is comprised of an inert gas.

almethod according to claim 5 **L**6. wherein said inert gas is nitrogen. In a method for making a nonporous body of high purity fused silica glass doped with at least one oxide dopant

comprising the steps of:

producing a gas stream containing a siliconcontaining compound in vapor form capable of being converted through thermal decomposition with oxidation or flame hydrolysis to SiO_2 and a compound in vapor form capable of being converted through oxidation or flame hydrolysis to at least one member of the group consisting $d_{\rm f}$ P_2O_6 and a metal oxide which has a metallic component selected from Group IA, IB, IIA, IIB, IIIA, IIIB, IVA, IVE, VA, and the rare earth series of the Periodic Table; passing said gas stream into (b) the flame of a combustion burner to form amorphous particles of fused SiO2 doped with an oxide dopant;

depositing said amorphous (c) particles onto a support; and

either\essentially (d) simultaneously with said deposition or subsequently thereto consolidating said deposit of amorphous particles into a non-porous body;

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the improvement comprising utilizing as said silicon-containing compound in vapor form a halde-free polymethylsiloxame, whereby no halide-containing vapors from said silicon-containing compound are emitted during the making of said nonprovus body of high fused silica glass.

A method according to claim 7

wherein raid polymethylsiloxane is hexamethylsiloxane.

9. The method according to claim 7 wherein said polymethylsiloxane is a polymethylcyclosiloxane.

wherein said polymethylcyclosiloxane is selected from the group consisting of octamethylcytlotetrasiloxane, decamethylcytlopentasiloxane, hexamethylcyclotxisiloxane, and mixtures

thereof.7 A method according to claim 7 wherein said compound in vapor form capable of being converted to at least one member of the group consisting of P_2O_5 and a metal oxide which has a metallic component selected from Group IA, IB, IIA, IIB, IIIA, IIIB XIVA, IVB, VA, and the rare earth series of the Periodic Table is a halide-containing compound. A method according to claim 7 be 12, wherein aid compound in vapor form capable of being converted to at least one member of the group consisting of P_2O_5 and a metal oxide which has a metallic component selected from Group IA, IB, IIA, IIB, IIIA, INB, IVA, IVB, V[B]A, and the rare earth series of the Periodic Table is a halide-free compound. In a method for making optical waveguide fibers of high purity fused

silica through the outside vapor

deposition process comprising the steps of:

- producing a gas stream (a) dontaining a siliconcontaining compound in vapor form capable of being converted through thermal decomposition with oxidation or flame hydrolysis to SiO2;
- passing said gas stream into (b) the flame of a combustion burner to form amorphous particles of fused SiO2;
 - depositing said amorphous (c) part cles onto a mandrel;
- consolidating said deposit of (d) amorphous particles into a non-pdrous, transparent glass body; and
- [and] drawing optical waveguide (e) fiber from said body;

the improvement comprising utilizing as said silicon-containing compound in vapor form a halide-free polymethylsiloxane, whereby no halide-containing vapors are emitted during the making of said optical waveguide fibers.

A method according to claim 13 114 wherein said polymethylsiloxane is

hexamethyld hoxane.

method according to claim 13 wherein sai olymethylsiloxane is a polymethylcyclociloxane] A method according to claim 15

wherein said polymethylcyclosiloxane is selected from the group consisting of octamethylcyclotetrasiloxane, decamethylcyclopen asiloxane, hexamethylcyclotrisiloxane, and mixtures thereof.

In a method for making optical waveguide\fibers of high purity fused

silica glass doped with an oxide dopant comprising the steps of:

(a)

- producing a gas stream containing a siliconcontaining compound in vapor form capable of being converted through thermal decomposition with oxidation or flame hydrolysis to SiO2 and a compound in vapor form capable of being converted through oxidation or flame hydrolysis to at least one member of the group consisting of p_2O_5 and a metal oxide which has a metallic component selected from Group IA, IB, IIA, IIB, IIIA, IIIB, IVA, IVB, VA, and the rare earth series of the Periodic Table;
- (b) passing said gas stream into the flame of a combustion burner to form amorphous partitles of fused SiO, doped with an oxide dopant;
- (c) depositing said amorphous particles onto a mandrel;
- (d) consolidating said deposit of amorphous particles into a non-porous transparent glass body, and
- (e) drawing waveguide fiber from said body;

the improvement comprising utilizing as said silicon-containing compound in vapor form a halide-free polymethylsiloxane, whereby no halide-containing vapors from said silicon-containing compound are emitted during the making of said optical waveguide fibers.

Lie A method according to claim 17 wherein and polymethylsiloxane is hexamethyldisiloxane.

19. A method according to claim 17 wherein sail polymethylsiloxane is a polymethylcyclosiloxane.]

wherein said polymethylcyclosiloxane is selected from the group consisting of octamethylcyclotyctrasiloxane, decamethylcyclotyctrasiloxane, hexamethylcyclotriailoxane, and mixtures thereof

wherein said [compounding] compound in vapor form capable of being converted to at least one member of the group consisting of PPs and a metal oxide which has a metallic component selected from Group IA, IB, III, IIIB, IVA, IVB, VA, and the race earth series of the Periodic Table is a halide-containing compound.

wherein said compound in vapor form capable of being converted to at least one member of the group consisting of P₂O₅ and a metal oxide which has a metallic component elected from Group IA, IB, IIA, IIB, IVA, IVB, VA, and the rare earth series of the Periodic Table is a halide-free compound.

In a method of making high purity fueed silica glass through the outside vapor deposition process comprising the steps of:

(a) producing a gas stream
containing a siliconcontaining compound in vapor
form capable of being
converted through thermal

decomposition with oxidation or flame hydrolysis of SiO2;

- (b) passing said gas stream into the flame of a combustion burner to form amorphous particles of fused SiO₂;
- (c) depositing said amorphous particles onto a mandrel; and
- (d) consolidating said deposit of amorphous particles into a non-porous, transparent glass body;

the improvement comprising utilizing as said silicon-containing compound in vapor form a halide-free [polymethylsiloxane] polymethylcyclosiloxane, whereby no halide-containing vapors from said silicon-containing compound are emitted during the making of said high purity fused silica glass.

[24. A method according to claim 23 wherein said polymethylsiloxane is hexamethyldisiloxane.]

[25. A method according to claim 23 wherein said polymethylsiloxane is a polymethylcyclosiloxane.]

26. A method according to claim [25]22 wherein said polymethylcyclosiloxane is selected from the group consisting of octamethylcyclotetrasiloxane, decamethylcyclopertasiloxane, hexamethylcycloreisiloxane, and mixtures thereof

A method according to claim
23, wherein said polymethylcyclosiloxane
is octamethylcyclotetasiloxane.

28. A method according to claim 27, wherein said octamethylcyclotetrasiloxane increases deposition efficiency over that achieved when silicon tetracyloride is utilized as

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said silicon-containing compound in vapor form.

29. A method according to claim 28, wherein the deposition efficiency increase is about 20%.

Nerein said belymethylcyclosiloxane is octamethylcyclotecraciloxane.

31. A method according to claim

30 wherein said
octamethylcyclotetrasiloxane increases
deposition efficiency over that achieved
when silicon tetrachloride is utilized as
said silicon-containing compound in vapor
form.

32. A method/according to claim
31, wherein the deposition efficiency
increase is about 20%.

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